12-13-2016

Evaluation of the Effectiveness of a Preference-Based Teaching Approach with Children with Developmental Disabilities

Liam D. Cerveny
The College at Brockport, ldcerveny@gmail.com

Evaluation of the Effectiveness of a Preference-Based Teaching Approach with Children with Developmental Disabilities

By

Liam D. Cerveny

A thesis submitted to the Department of Psychology of the College at Brockport, State University of New York, in partial fulfillment of the requirements for the degree of

Master of Arts

December, 13, 2016

ACKNOWLEDGMENTS

I would like to acknowledge Dr. Marcie Desrochers, my advisor and the chair of my thesis committee for her constant help and guidance on this project, from conception to completion. In addition, I would like to acknowledge my two other committee members, Dr. Janet Gillespie and Dr. Amanda Lipko-Speed. Finally, I would like to acknowledge Gwen Parks and Miranda Merton, who served as research assistants for this study.

Table of Contents

Figures

Tables

Abstract

Preference-based teaching (PBT) incorporates choice and preferred activities into a teaching task to increase the rate of learning among students with developmental disabilities (DD). This study compared the efficacy of discrete trial training with and without PBT. Participants included three students from an afterschool facility that serves children with DD. Researchers met with each participant in one-on-one teaching sessions to determine if the PBT method embedded in discrete trial training led to more learning than discrete trial training alone. Learning occurred in both conditions and there was no clear difference between the PBT and comparison conditions. Generalization and social validity assessments were conducted for each participant. The generalization assessments failed to show a difference between conditions such that all participants retained the same amount of learned skills across both conditions. During the social validity assessments, all three participants chose the PBT condition over the discrete trial training condition. Interpretations of the results are discussed.

Evaluation of the Effectiveness of a Preference-Based Teaching Approach with Children with Developmental Disabilities

Discrete trial training (DTT) is an instructional approach for teaching new behaviors that is often used with children and adults with Developmental Disabilities (DD) (Lerman, Valentino, & LeBlanc, 2016). When administering DTT, an instructor meets individually with a child and teaches a specific behavior or group of behaviors that the child did not perform correctly during a previous baseline assessment. During a training trial, the teacher presents a request to the student along with any training material required to complete the task (e.g., "Point to the ball" when a ball and two other objects are presented). When a student correctly completes the request or an approximation of it within 5 seconds, the instructor provides immediate positive reinforcement. Positive reinforcement is a principle and procedure where in a given situation, if someone does something and it is immediately followed by a positive reinforcer, then that behavior is more likely to occur in future similar situations (Cooper, Heron, & Heward, 2007). A positive reinforcer is an object, event, or activity that, when delivered immediately after a behavior, serves to increase that behavior. Positive reinforcement has consistently been shown to increase on-task behavior and decrease off-task behavior for children with DD (Leaf et al., 2014). By positively reinforcing every correctly completed step in a teaching task, a teacher can increase the likelihood that their student will continue to work on that task and learn the skill. A trial is followed by an interval of 3 seconds after which the next trial is presented.

In addition to use of positive reinforcement for correct responding, a main component of DTT is prompting, wherein the teacher assists the student in completing a particular behavior, or a step within a behavior (Cooper et al., 2007). Prompt trials are delivered following the student's incorrect or omitted responses. Prompts can take many forms, such as verbal instructions,

physical imitations of the behavior, or physically assisting the student to perform the behavior. DTT has been successfully used to teach students a variety of new behaviors, including home-skill behaviors (Batu, 2008), sight words (Coleman, Cherry, Moore, Park, & Cihak, 2015), and shooting a basketball (Lo, Burk, & Anderson, 2014). Another component that it integral to DTT is fading, in which the teacher systematically reduces the prompts given to the student over the course of teaching (Cooper et al., 2007). This prompting and fading procedure has been shown to reduce problem behaviors (Ringdahl et al., 2002), and increase compliance with teaching demands (Knox et al., 2012).

DTT has been shown to be effective in teaching children with DD, including autism spectrum disorder (Smith, 2001), a wide range of new behaviors (Downs, Downs, Fossum, & Rau, 2008; Lerman, Valentino, & LeBlanc, 2016). DTT has also been effectively taught to undergraduate students (Downs, Downs, & Rau, 2008), and parents (Crockett, Fleming, Doepke, & Stevens, 2007), making it a useful instructional approach for developing new behaviors.

Although DTT has shown to be effective in teaching new behaviors to a range of people with DD, in certain instances, improvements and adjustments to this instructional approach may be warranted. Ferraioli, Hughes, and Smith (2005) highlight several factors that may limit the effectiveness of DTT and suggest ways to increase effectiveness in these cases. One example of a limiting factor is when the student engages in problem behavior, such as tantrums and aggression. Ferraioli et al. (2005) suggest that problem behavior may be addressed in several ways depending on its function, such as increasing breaks for the student before problem behaviors start, or increasing the opportunity for the student to receive reinforcement. Another factor that may limit the effectiveness of DTT is lack of motivation by the student. Ferraioli et al. (2005) suggest addressing motivation by ensuring that items used as reinforcers during training

are truly preferred by the student and limiting access to preferred activities outside of instructional settings.

Shillingsburg, Bowen, and Shapiro (2014) evaluated the effectiveness of altering the traditional DTT approach to make the intervention more effective for people with autism spectrum disorder (ASD). Shillingsburg et al. (2014) note that people with ASD may react to the instructions involved with using DTT by engaging in problem behavior and social avoidance, such as lack of engagement with others and physically leaving a work area, which can limit its effectiveness. To address these concerns, Shillingsburg et al. (2014) examined the behavior of two participants with ASD at a day care facility during typical DTT sessions. A designated time after these sessions, the participants would meet with a therapist for several sessions, during which demands were not placed on the participants, and there was access to preferred activities and lots of reinforcement. When the participants returned to their DTT sessions, both exhibited lower levels of problem behavior and social avoidance compared to their baseline phases. These changes to the DTT framework, as well as those suggested by Ferraioli, Hughes, and Smith (2005) mentioned above, are attempts to alter the instructional approach to increase its effectiveness, while maintaining the integrity of the DTT approach.

Preference-based teaching (PBT) is an intervention to reduce students' off-task behavior and increase learning specific tasks by incorporating students' with DD preferred activities and reinforcement during DTT (Reid & Green, 2005, 2006). Using preference-based teaching, a teacher offers a preferred activity to a student before, during, and after a teaching session. This procedure may enhance the student's enjoyment of working with the teacher and increase the student's focus on the teaching task. The goal of providing a preferred activity before each teaching session is to facilitate the student's enjoyment of the activity from the start. Presenting

the preferred activity in the middle of the session allows the student to have a short break from work. Finally, the work sessions ends with the student being presented with another preferred activity by the teacher. As stated in the previous section, lack of motivation, increased social avoidance, and engagement in problem behaviors can cause DTT to be less effective. The PBT approach attempts to address these concerns by incorporating enjoyable and potentially motivational activities into the intervention itself (Reid & Green, 2006). PBT may be a useful tool for reducing the problem behavior of students. If the problem behavior is maintained by positive reinforcement (e.g. attention by the teacher), starting off a work activity with a preferred activity may eliminate the student' motivation for the problem behavior. While the student engages in the activity, the teacher can take the opportunity to provide lots of positive reinforcement, thus further reducing the motivation for problem behavior. The student would also be less likely to engage in problem behavior maintained by negative reinforcement (e.g. escape from the task), because the first section of the work session is an activity preferred by the student.

The second main component of preference-based teaching is to follow the DTT format by providing immediate positive reinforcement to the student for correctly response during the teaching task. By combining preferred activities and DTT, the preference-based teaching approach uses three different components in an attempt to increase learning of new skills. Green, Reid, Rollyson, and Passante (2005) evaluated the effectiveness of using a PBT intervention to teach new behaviors to three women with multiple disabilities. An ABAB research design was used for two of the participants, while a quasiexperimental design was used for the third. All three participants lived in a residential home for people with DD. The researchers periodically observed the participants in their typical teaching program, which followed DTT guidelines. For

the experimental condition, the researchers implemented an intervention that incorporated the PBT components detailed above. The results showed that the participants' rate of learning was the same for both conditions, but the PBT intervention lead to lower rates of resistance and indices of unhappiness.

PBT is a relatively new approach that has been used with people with DD and its effectiveness and usefulness in different settings is still being determined. As such, more research is needed to evaluate the scope of populations that PBT can be used with and settings that it can be used in. The current study aimed to compare the effectiveness of DTT with and without PBT to teach new adaptive behaviors to children and adolescents with DD. The PBT approach follows the framework introduced by Reid and Green (2006). By focusing on children and adolescents, the current study evaluated the effectiveness of PBT compared to a DTT approach among a new age range of people with DD. This study also took place in an afterschool facility, which is a new setting for evaluating the impact of PBT. It was hypothesized that the DTT with PBT condition would lead to learning at a faster rate by participants than the traditional DTT condition. Both conditions share the DTT approach, while the experimental condition adds the component of preferred activities, which could make it a more effective intervention.

Method

Participants

This study was conducted at an afterschool facility located in the Northeastern part of the United States, which serves children with DD. Recruitment of participants began following approval from school administration and the IRB of The College at Brockport-SUNY. The participants are three students who regularly attend the afterschool program. The students in this

program have a wide range of disabilities and special needs. Exclusion/inclusion criteria of student participants did not rely on any particular diagnoses. Instead, any student attending the afterschool program was eligible for enrollment.

Letters describing the study (see Appendix A) and informed consent forms (see Appendix B) were sent home to parents/guardians of the children who attend the afterschool program. Parents/guardians who wanted to have their children participate were instructed to return the consent form to the afterschool administrators. The administrators then contacted the researchers to inform them of participant enrollment. The letters and informed consent forms sent to the parents/guardians also had the lead researcher's contact information, so that parents/guardians could request more information about the study.

Three participants were recruited for the study. In the following descriptions, their names have been changed to protect their confidentiality. David is a 16 year old male diagnosed with ASD. He attends a school that serves children with special needs and is currently in their high school program. He has minimal verbal ability and communicates mainly through single words, head nods, and some basic American Sign Language. Mark is a 12 year old male diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). He attends a school that serves children with special needs and is currently in their middle school program. His communication skills are typical for his age. In school, he was currently working on his reading and writing. Jay is a 9 year old male diagnosed with ASD. He currently attends a school for children with DD. Jay displayed many skills that were typical for his age. He was able to read sections of books and answer comprehension questions about the material. However, he was either not able or willing to answer questions about himself (e.g., How old are you? Do you have a brother or a sister?).

Recruitment and Eligibility

After the informed consent was received from the parents, assent was sought from the participants. A researcher explained the general procedure of the study to each participant, asked if there were any questions for clarification, and an informed assent form was signed by the participant, or by an afterschool facility staff member in cases where the student was unable to sign his name (copy of informed assent form in Appendix C).

Setting & Materials

The study took place at the afterschool program facility. Prior to a session, researchers would find a room that was not in use and organize it to fit the needs of the study activities. Using an empty room reduced the potential distraction of other students at the facility. Often, up to three researcher-participant pairs met in the same room to conduct study sessions. On these occasions, attempts were made to separate each pair as much as possible to eliminate potential distractions. The working space consisted of a table with a chair on either side or perpendicular to each other, one for the participant and one for the researcher. A third chair was positioned facing the researcher, with the back to the participant. The researcher would put the preferred activities on this chair. By positioning the chair this way, the participant was blocked from the distraction of seeing the preferred activities, but they were still readily available for the researcher.

The materials used for the study mainly consisted of toys and activities for the participants to use as their preferred activities. For David (see Appendix D) and Mark (see Appendix E), six items were used for the preference assessment (copy of paired preference assessment in Appendix F), with the three most preferred items used during the training sessions. The six items used for David and Mark's preference assessments were decided by the research

team after meeting with the afterschool facility staff members. The staff members were asked what the participants' favorite activities, toys, and items were at the facility. The activities included were chosen because they were things that the researchers thought the participants would enjoy, were portable enough to easily transport, and were items that the participants' could engage in for a short period of time. Jay did not show a preference for any particular item during the paired preference assessment. He did not consistently pick any items more than others. Instead, he picked items that had not been presented before, but then would pick that item again. As a result, the researchers conducted a multiple stimuli preference assessment during each training session. From this assessment, the researchers were able to determine a number of different items that Jay preferred (see Appendix G). Rather than give a specific preferred item after completion of a learning trial and a choice of two preferred items during the experimental phase, Jay was given an option of all of his preferred items. This was done to combat potential satiation.

Research Design

An alternating treatment design was used with each of the three participants in this study. The alternating treatment design is used to compare the effectiveness of two interventions that are being applied concurrently (Barlow & Hays, 1979). With an alternating treatment design, two or more conditions are administered on the same day as long as they are clearly defined. Across days of the study, the order of presentation of conditions are counterbalanced to control for the impact that the order of conditions may have on the results. In the current study, the control and experimental conditions were both applied each day that the researchers met with each participant. Following the end of the first teaching session, the researcher gave the participant a

brief break before beginning the next session. Sessions continued across days until a trend and stability in the data were apparent.

Procedure

Preassessment

After participant enrollment, the researchers met with staff members at the afterschool program to gather background information on each participant. During these meetings the researcher asked school staff about the skills that each participant was currently working on or did not engage in, current academic/vocational levels, and favored activities of each participant. The research team then met to determine the skill to focus on for each participant during the training sessions, and create a list of activities and toys to use for the preference assessments. The research team focused on choosing individualized behaviors for each participant based on their developmental, cognitive, and educational levels. David was taught functional signs using American Sign Language (ASL) (task analysis of signs in Appendix H; list of signs in Appendix I), Mark was taught how to hand write individual words (list of words in Appendix J), and Jay was taught how to answer personal questions (list of questions in Appendix K).

Once a skill and list of preferred activities were identified for each participant, researchers met with the participants one-on-one to conduct a baseline skill assessment and preference assessment. The baseline assessment consisted of a researchers meeting one-on-one with the participants to determine the specific skills each participant would work on during teaching sessions. The researcher conducted a probe trial in which the participant was asked to complete a particular task (e.g., “Sign brother”) and given up to 5 seconds in which to respond. No positive reinforcement was delivered after these trials. Instead, previously known tasks were intermittently presented and correct responses by the participant resulted in the immediate

delivery of a positive reinforcer such as a preferred toy. Each task was presented for three probe trials. If a participant correctly responded to the probe trial for a particular task at least once, it was eliminated from the list. This left a list of tasks each participant did not know how to correctly perform on all three probe trials. The items on the list were then randomly assigned to control and experimental conditions.

Researchers then met with the participants to conduct a preference assessment (Karsten, Carr, & Lepper, 2011). For David and Mark, a paired preference assessment was used. In a paired preference assessment, all paired comparisons of 5-6 items are presented twice with two items are presented to an individual at a time and that individual is asked to choose between them by the researcher (Pace et al., 1982). After a choice is made, two more items are presented and the individual is again asked to choose one. This pattern is continued until every item has been presented with every other item, and all items have been presented on both the left and right sides. For this study, each assessment contained six total items. Jay did not respond well to the paired preference assessment, as he was constantly looking for more items during the training sessions. As a result, a multiple stimuli preference assessment (Karsten et al., 2011) was used for Jay at the start of each session. With a multiple stimuli preference assessment, many items are presented to an individual at the same time. The item selected is then used as a consequence for correct responses by the participant during training trials.

General Teaching Session Procedure or DTT

Prior to the start of the DTT condition, an orange folder was placed on the table in front of the participant. At the beginning of the first condition of the day, the researcher would introduce the teaching activity by saying, “Today we’re going to be working on (specific activity).” At the beginning of the second condition of the day, the researcher would say “Now

we're going to keep working on (specific activity)." In the control condition, the researcher would then present a probe trial. To conduct the probe trial for David, the researcher would say, "Sign (designated word)." For Mark, the probe trial consisted of the researcher saying, "Write (designated word)." For Jay, the probe trial involved the researcher asking the designated question. For every correct response the participant gave to a probe trial, the researcher would provide immediate verbal reinforcement and a preferred activity for approximately 10 seconds. If the participant gave an incorrect response, or did not respond within 5 seconds, the researcher would provide a prompt trial. If the participant again gave an incorrect response, or did not respond within 5 seconds, the researcher would provide a second prompt. The first prompt or, partial prompt, entailed the researcher providing the participant with assistance in partially completing the correct behavior. The second prompt or full prompt involved the researcher demonstrating the entire behavior to the participant. For David's first prompt, the researchers would make the handshape of the designated sign with their hands. For the second prompt, the researchers would move their own hands to the place on the body where the sign would take place (copy of teaching procedure in Appendix L). Mark's first prompt consisted of the researchers verbally spelling the word out letter by letter with a pause of one second between letters. For the second prompt, the researchers would say a letter, wait for him to write it, and then say the next letter (copy of teaching procedure in Appendix M). Jay was only given one type of prompt, a verbal prompt (copy of teaching procedure in Appendix N). For all participants, the prompts were designed this way to provide least-to-most assistance involving the researcher providing the smallest amount of assistance that the participant needs to successfully complete a step or task and if additional errors occur then further assistance was provided (Cooper, Heron, & Heward, 2007). For all participants, when a participant gave a

correct response to either level of prompt (i.e., partial or full), the researcher would provide verbal reinforcement, and not a preferred activity, after which another probe trial was presented. The criterion for considering a specific task learned was six consecutive correct responses by the participant on probe trials. Participant-researcher dyads worked on a specific task until it was learned to criterion or the session time expired. For David and Mark, the sessions lasted 15 minutes each. Jay's sessions on his first day lasted 15 minutes, but he was not able to stay on task during the whole time period. For the second training day and on the researchers shortened his sessions to 5 minutes each, which was held constant for the rest of the study.

Experimental Condition

Prior to the start of the experimental condition, a green folder was placed on the table in front of the participant. In the experimental condition, the researcher offered the participant a choice of preferred activities at three specific points using the PBT approach (Reed & Green, 2005). The first presentation of preferred activities took place at the very beginning of the teaching session, the second presentation was around the halfway point of the session, and the third was at the very end of the session. Once the participants chose which preferred activity they wanted, they were allowed to play with it for about one minute. The timing of the presentation of the preferred activities in the middle of the session was left slightly variable to allow the dyad time to focus on the learning activity. For example, if the participant was close to learning a specific task to criterion, the researcher would continue with the probe trials until the task was learned or an incorrect response was given. Following either a learned task or an incorrect response, the researcher would pause for 5 seconds and say, "Now we're going to have a break," and present the choice of preferred activities.

Comparison Condition

The comparison condition was conducted using the general training, or DTT, procedure. The main difference between conditions was that in the comparison condition, the researcher did not present preferred activities to the participant at the specified times used in the PBT condition. The researcher did, however, provide preferred activities after the participant correctly responded to a probe and positive verbal reinforcement for a correct response following a prompt, during the comparison condition as per the general training procedure described above.

Interobserver Agreement

An independent observer conducted reliability checks for 30% of the teaching sessions to assess consistent and accurate recording of the dependent variable by the researcher. The second observer recorded the same behavior in the same way as the main recorder. An interobserver reliability score is calculated by comparing the number of agreements over the number of agreements plus disagreements and then multiplied by 100. This formula gives the percentage of times both raters agreed on the participants' correct responses, incorrect responses, and omissions. An adequate interobserver reliability score is considered to be 80% or better. In the teaching sessions where IOR was performed, agreement in responses between raters was at 94% or higher for all participants in both conditions.

Social Validity

After completion of all training sessions, a social validity assessment was performed. As mentioned above, a green folder was placed in front of each participant before the PBT sessions and an orange folder was placed in front of them before the DTT sessions. To assess the social validity of the interventions, the participants were asked to choose between the green and orange conditions. Social validity was conducted one time and occurred after the completion of all

training sessions. The researcher then conducted a teaching session using the procedure for the condition that was picked. This was done to evaluate which intervention each participant preferred most.

Generalization

After the participants completed four sessions, the researchers assessed the participants' generalization of learned tasks across time or maintenance of skills acquired. All of the tasks that had been learned to criterion over the past two weeks' of session were tested. The researcher provided no prompt trials following the participant's incorrect responses and no positive reinforcement for correct responses.

Results

The present study compared the efficacy of the PBT approach with DTT to a DTT alone approach. The results indicate that both approaches were equally effective, both in terms of skill acquisition and percent correct responding, for all three participants. All three participants acquired skills in both conditions.

Mark's results show that he learned to write the same number of words across both conditions in every session, averaging two learned words per session (see Figure 1). There was an upward trend for his first three sessions, as he learned an additional word in each condition of those sessions. However, after the third session that trend stabilized, with two words learned in each condition for the next two sessions. Both conditions were equally effective in teaching Mark, as he learned to write at least one new word per condition in each study session.

Mark's percentage of correct responses also shows no reliable difference between conditions (see Figure 2). In his first session, Mark's correct responding during the PBT condition was greater than that during the DTT condition. In the remaining sessions, his

percentage of correct responses between conditions never differed by more than five percent. Mark's rate of correct responses in both conditions was essentially the same.

Jay's number of tasks learned was also quite stable across conditions (see Figure 3). There was only one session in which he learned one more answer to a question in the PBT condition than in the DTT (viz., session 5). Jay also learned to answer very few questions to criterion in both conditions. Overall, he only learned to answer two questions in the PBT condition and one in the DTT condition. On four out of the six days he met with researchers, he did not learn to answer any questions in either condition.

Out of Jay's six sessions, in only two did he show a difference in percent correct responses between conditions greater than nine percent (see Figure 4). There was no apparent trend suggesting that he consistently gave more correct responses in either condition.

Of the three participants, David learned the most tasks to criterion and his data was also the most erratic, particularly for the first five sessions (see Figure 5). His data also showed no consistent difference between conditions. The number of tasks he learned in a given condition varied by session, ranging from 0 to 4. Over David's last seven sessions, the number of tasks learned per condition never differed by more than one and he learned the same number of tasks in four of those seven sessions.

David's percent correct responding does not show consistently more correct responses in one condition compared to the other (see Figure 6). In half of David's 12 sessions, his percentage of correct responses did not differ between conditions by more than 13.1 percent. In the other half of his sessions, his correct responses differed by a low of 21.6% and a high of 84%. In these six sessions, the condition that he gave a higher percentage of correct responses to was split evenly; in three he correctly responded to PBT trials at a higher rate and in three he correctly

responded to DTT trials at a higher rate. Again, this suggests that neither condition was superior in increasing David's percentage of correct responses.

In addition to analyzing the participants' ability to learn on a session by session basis, the researchers also looked at how well the participants' were able to retain the information that they had learned. During his generalization assessment, Jay correctly answered each of the three questions he had previously learned, two of which he learned in the PBT condition and the third he learned in the DTT condition (see Table 1). Mark correctly wrote 50% of the words he learned during PBT sessions, compared to 60% of those he learned during DTT sessions (see Table 2). However, Mark learned 10 words in each condition, so the 10% difference represented only a single additional word during his generalization assessment. Receiving the most training sessions, David also had the most generalization assessments, a total of three. In his first generalization assessment, the difference in his percentage of correct responses was caused by one additional correct response in the PBT condition (see Table 3). In two of those assessments his percentage of correct responses was the same (see Tables 4 and 5). Over his three generalization assessments, David's responses to each condition were nearly identical (see Table 6). Like the data presented above, the generalization assessments failed to show a significant difference between the DTT and PBT approaches for any of the participants. During the social validity assessments, all three participants chose the PBT condition over the DTT condition.

Discussion

The goal of preference-based teaching is to teach new adaptive behaviors to students with DD. The results of this study show that there was no difference in learning adaptive skills when PBT was added to DTT for all three participants. The results gathered in this study fail to show that PBT with DTT is better than DTT alone in terms of teaching students with DD new

behavioral skills or maintaining the skills learned. However, all three participants chose the PBT condition during their social validity assessments which is an indication that they may have preferred that condition more, even if it did not lead to more learning.

These results of no difference in participants' skill acquisition between DDT with and without PBT match those of Green et al.'s (2005) study involving three adult participants at a care facility However, in Green et al.'s (2005) study the PBT condition did result in lowered resistance and indices of unhappiness. In the current study, resistance to teaching and off-task behavior was not formally documented. However, researchers did observe that Jay was the only participant to display such behavior. His most frequent off-task behavior was noncompliance in the form of attempting to leave the room. As Jay continued to work with the researchers, these behaviors decreased in both conditions.

David was typically excited to see the researchers and would walk to the work area right away. He generally seemed very eager to please and would work on the tasks with enthusiasm throughout the entire session, regardless of condition. While Mark was less excited than David, but still fully complied with all requests made by the researchers. During several sessions he asked how much longer the session would last. He explained that it was almost time for him to leave and he wanted to play with his friends before he went home. This occurred in both conditions. Even though he clearly would have rather been playing, Mark still finished his session and did not engage in any off-task behaviors.

There are several potential reasons for this finding of no difference in participants' skill acquisition between the PBT and DTT versus the DTT condition alone. PBT and DTT share certain fundamental aspects that, in practice, made them quite similar. Both call for the teacher to clear the working area of any distractions to allow the student to focus on the task at hand. Both

incorporate one-on-one teaching, allowing the teacher to provide immediate feedback to the student concerning accuracy of responding to a task. In this study, in both conditions the participants received positive verbal reinforcement and a preferred activity immediately after successfully completing a task demand.

In effect, the major difference between conditions was the three presentations of a choice of preferred activities and a brief period (1-2 minutes) of engaging in that activity during PBT conditions. This PBT procedure may not have been enough of a difference to meaningfully impact the amount of learning that occurred. Perhaps increasing the amount of time spent engaging in the preferred activities would have increased the learning that occurred during the PBT condition. Session times were determined by taking into account the amount of time each participant would likely be able to focus on a given task. However, it is possible that increasing the time spent on the preferred activities, to perhaps 5 minutes, instead of the 1 minutes that was used in this study, could have led to a longer time period that each participant was willing to work on their task. In the study by Green et al. (2005), the preferred activities usually lasted 2-3 minutes. Shillingsburg et al. (2014) allowed three participants with autism to meet with a special therapist for several 20 minute sessions. During these sessions, the participants were not given any demands, were provided with preferred activities, and were given lots of positive reinforcement. When the participants returned to their typical DTT work condition, they stayed engaged longer and showed less social avoidance. Perhaps a similar concept could be applied to the PBT framework. Allowing longer times for the participants to engage with the preferred activities could lead to an increase in learning during teaching activities.

It is possible that increasing the quality of preferred activities would have increased the effectiveness of PBT (Ferraioli, Hughes, & Smith, 2005). The preferred activities offered as

choices during the PBT sessions and the activities provided after the participants' successfully completed a trial were drawn from the same preference assessment. As mentioned above, the two highest preferred activities were used as the choice options, while the third highest preferred activity was given to the participants' after a successful trial. There might not have been enough of a difference in quality between these activities to successfully motivate the participants to learn more skills during the PBT trials. Perhaps it would have been beneficial to have the two sets of preferred activities belong to obviously distinct categories, for example to offer two preferred gross-motor activities during the PBT-specific times, and offering a toy or game for a correct response to a probe. This may help draw a contrast between being presented an activity for correctly completing a trial and being presented an activity as part of the PBT intervention.

Another way to improve the quality of the activities given to the participants would be to ensure the activities were reinforcers rather than just preferred activities. Rather than a preference assessment, the researchers would conduct a reinforcer assessment with the different activities to determine which activities were most reinforcing for each participant. A reinforcer assessment is a procedure to determine what items and activities are reinforcing to particular individuals (Da Fonte, Boesch, Edwards-Bowyer, Restrepo, & Bennett, 2016). In an ABAB design reinforcer assessment, a stimulus is delivered immediately following a particular behavior in the A phase. In the B phase, the stimulus is delivered noncontingently. If the behavior is consistently higher during the A phase compared to the B phase, then the stimulus is determined to be a positive reinforcer. While the activities used for this study were shown to be preferred by the participants, it was not determined if the activities were actually reinforcing. These preferred activities were given in both conditions following correct responses and a choice of activities were given in the PBT condition at specific times. Presenting a choice of activities known to be

reinforcing to the individual participant may have increased the effectiveness of the PBT with DTT intervention compared to DTT alone (Da Fonte et al., 2016).

The presentation of choices and preferred activities to people with DD has consistently been shown to decrease rates of problem behavior (Romaniuk & Miltenberger, 2001; Seybert, Dunlap, & Ferro, 1996; Shogren, Faggella-Luby, & Wehmeyer, 2004). Reduced rates of problem behavior should translate into more time and focus spent on instructional activities. In turn, an increase in focus on instructional activities should result in a higher rate of learning. The reduction of problem behaviors for people with DD is an important goal alone, independent of the impact it has on rate of learning. Still, the most ideal situation would have problem behavior reduced and rate of learning increased. Through classical conditioning, it is possible that the student will associate the teacher with the enjoyable activity. McLaughlin and Carr (2005) were able to reduce problem behavior using this approach which they termed building rapport. Building rapport in this way may increase the student's motivation to work on the instructional task. PBT might also be useful in reducing a student's motivation for engaging in problem behavior. If the problem behavior is maintained by positive reinforcement (e.g. attention from the teacher), then the teacher can use the preferred activity period at the start of each work session to provide positive reinforcement in a way that is conducive to the work task. If the behavior is maintained by negative reinforcement (e.g. escape from the task), then the preferred activity at the start of the session should motivate the student to stay at the work area and then to engage in the work task itself.

Changing the research design from an alternating treatments design to an ABAB or BABA design may lead to detection of a treatment effect. In an ABAB design, phase A would be the DTT condition, while B would be the PBT condition (Cooper, et al, 2007). Each condition by

itself is sequentially presented to the participant for at least five or more days, rather than both within the same day, as was done with the current study. This might help to create a stronger contrast between the conditions, potentially leading to a treatment effect. It would also lead to less carryover effects. Perhaps separating the conditions by at least a five day period rather than by several minutes, may have made a difference in evaluating each condition's effectiveness.

In this study, both DTT with and without PBT conditions both showed roughly the same amount and rate of learning per participant. The PBT condition required slightly more forethought and setup, as it required the use of two extra preferred activities that were not present during the DTT condition. This extra effort was negligible and all of the preferred activities were chosen because they would be easily accessible to staff at the afterschool program. The only tangible difference between the conditions was that all three of the participants chose the PBT with DTT condition over the DTT alone condition. In light of the other similarities between interventions, PBT may have some merit for teachers to use in the classroom due to the simple fact that it was more preferred by the participants. This preference may be associated with McLaughlin and Carr's (2005) finding that engaging in preferred activities together led to increased rapport and lowered disruptive behaviors during resident-staff interactions.

Future research in this area could focus on applying PBT to a narrower range of participants' areas of skill deficiency. The three participants in this study had markedly different levels of adaptive behavior. Perhaps a tighter focus on the diagnosis and adaptive behaviors would show where PBT might be most beneficial. Mark was diagnosed with ADD, while Jay and David were both diagnosed with ASD. However, Jay and David were very different in terms of their verbal and cognitive abilities. Along the same lines, future research could systematically document the rate of problem or off-task behavior of participants. For this study, the researchers

only gathered anecdotal information. If PBT can lead to lower rates of problem behavior, than it may be a worthwhile intervention, regardless of whether it increases rate of learning.

While the PBT with DTT intervention did not show itself to be more effective than DTT alone, it was not less effective either in terms of rate of learning and maintenance of skills acquired. The extra periods of preferred activities provided during PBT have the potential to increase the treatment's effectiveness. In addition, all three participants chose PBT over DTT. For these reasons, more research should be focused on implementing PBT interventions for people with DD.

References

Barlow, D.H., & Hayes, S.C. (1979). Alternating treatments design: One strategy for comparing the effects of two treatments in a single subject. *Journal of Applied Behavior Analysis, 12,* 199-210. doi: 10.1901/jaba.1979.12-199.

Batu, S. (2008). Caregiver-delivered home-based instruction using simultaneous prompting for teaching home skills to individuals with developmental disabilities. *Education and Training in Developmental Disabilities, 43,* 541-555.

Coleman, M.B., Cherry, R.A., Moore, T.C., Park, Y., & Cihak, D.F. (2015). Teaching sight words to elementary students with intellectual disability and autism: A comparison of teacher-directed versus computer-assisted simultaneous prompting. *Intellectual and Developmental Disabilities, 53,* 196-210. doi: 10.1352/1934-9556-53.3.196.

Cooper, J.O., Heron, T.E., & Heward, W.L. (2007). *Applied behavior analysis: Second edition*. Upper Saddle River, New Jersey: Pearson Education, Inc.

Crockett, J.L., Fleming, R.K., Doepke, K.J., & Stevens, J.S. (2007). Parent training: Acquisition and generalization of discrete trials teaching skills with parents of children with autism. *Research in Developmental Disabilities, 28,* 23-36. doi: 10.1016/j.ridd.2005.10.003.

Da Fonte, M.A., Boesch, M.C., Edwards-Bowyer, M.E., Restrepo, M.W., Bennett, B.P. (2016). A three-step reinforcer identification framework: A step-by-step process. *Education and Treatment of Children, 39,* 389-410.

Downs, A., Downs, R.C., Fossum, M., & Rau, K. (2008). Effectiveness of discrete trial teaching preschool students with developmental disabilities. *Education and Training in Developmental Disabilities, 43,* 443-453.

Downs, A., Downs, R.C., & Rau, K. (2008). Effects of training and feedback on discrete trial teaching skills and student performance. *Research in Developmental Disabilities, 29,* 235-246. doi: 10.1016/j.ridd.2007.05.001.

Ferraioli, S., Hughes, C., Smith, T. (2005). A model for problem solving in discrete trial training for children with autism. *Journal of Early and Intensive Behavior Intervention, 2,* 224-246. doi: 10.1037/h0100316.

Green, C.W., Reid, D.H., Rollyson, J.H., & Passante, S.C. (2005). An enriched teaching program for reducing resistance and indices of unhappiness among individuals with profound multiple disabilities. *Journal of Applied Behavior Analysis, 38,* 221-233. doi: 10.1901/jaba.2005.4-04.

Karsten, A.M., Carr, J.E., & Lepper, T.L. (2011). Description of a practitioner model for identifying preferred stimuli with individuals with autism spectrum disorder. *Behavior Modification, 4,* 347-369. doi: 10.1177/0145445511405184.

Knox, M., Rue, H.C., Wildenger, L., Lamb, K., & Luiselli, J.K. (2012). Intervention for food selectivity in a specialized school setting: Teacher implemented prompting, reinforcement, and demand fading for an adolescent student with autism. *Education and Treatment of Children, 35,* 407-417.

Leaf, J.B., Dale, S., Kassardjian, A., Tsuji, K.H., Taubam, M., McEachin, J.J., & Leaf, R.B. (2014). Comparing different classes of reinforcement to increase expressive language for individuals with autism. *Education and Training in Developmental Disabilities, 49,* 533-546.

Lerman, D.C., Valentino, A.L., & LeBlanc, L.A. (2016). Discrete Trial Training. In R. Lang, T.B. Hancock, & N.N. Singh, *Early Intervention for Young Children with Autism Spectrum Disorder (47-83).* Switzerland: Springer International Publishing.

Lo, Y., Burk, B, Anderson, A.L. (2014). Using progressive video prompting to teach students with moderate intellectual disability to shoot a basketball. *Education and Training in Autism and Developmental Disabilities, 49,* 354-367.

McLaughlin, D.M. & Carr, E.G. (2005). Quality of rapport as a setting event for problem behavior: Assessment and intervention. *Journal of Positive Behavior Interventions, 7,* 68-91. doi: 10.1177/10983007050070020401.

Pace, G.M., Ivancic, M.T., Edwards, G.L., Iwata, B.A., & Page, T.J. (1985). Assessment of stimulus preference and reinforcer value with profoundly retarded individuals. *Journal of Applied Behavior Analysis, 18,* 249-255.

Reid, D.H., & Green, C.W. (2005). *Preference-based teaching: Helping people with developmental disabilities enjoy learning without problem behavior*. Habilitative Management Consultants, InC

Reid, D.H., & Green, C.W. (2006). Preference-based teaching: Helping students with severe disabilities enjoy learning without problem behavior. *TEACHING Exception Children Plus, 2,* Article 2. Retrieved 11/19/2015 from http://escholarship.bc.edu/education/tecplus/vol2/iss3/art2

Ringdahl, J.E., Kitsukawa, K., Andelman, M.S., Call, N., Winborn, L., Barretto, A., & Reed, G.K. (2002). Differential reinforcement with and without instructional fading. *Journal of Applied Behavior Analysis, 35,* 291-294.

Romaniuk, C. & Miltenberger, R.G. (2001). The influence of preference and choice of activity on problem behavior. *Journal of Positive Behavior interventions, 3,* 152-159.

Seybert, S., Dunlap, G., & Ferro, J. (1996). The effects of choice-making on the problem behaviors of high school students with intellectual disabilities. *Journal of Behavioral Education, 6,* 49-65.

Shillingsburg, M.A., Bowen, C.N., Shapiro, S.K. (2014). Increasing social approach and decreasing social avoidance in children with autism spectrum disorder during discrete trial training. *Research in Autism Spectrum Disorders, 8,* 1443-1453. doi: 10.1016/j.rasd.2014.07.013.

Shogren, K.A., Faggella-Luby, M.N., Bae, S.J., & Wehmeyer, M.L. (2004). The effect of choice-making as an intervention for problem behavior: A meta-analysis. *Journal of Positive Behavior Interventions, 6,* 228-237.

Smith, T. (2001). Discrete trial training in the treatment of autism. *Focus on Autism and Other Developmental Disabilities, 16,* 86-92. doi: 10.1177/108835760101600204.

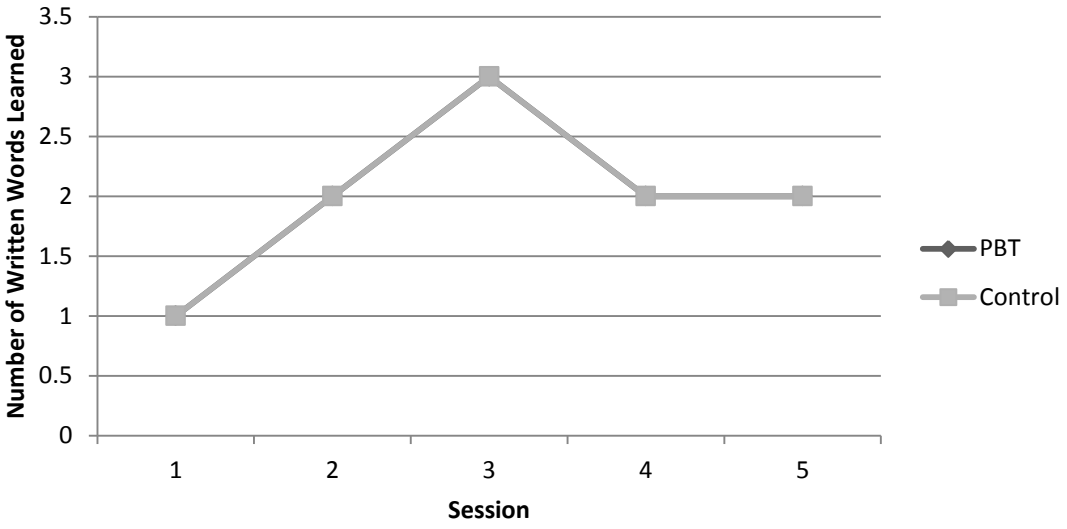

Figure 1. Number of skills learned per session for Mark.

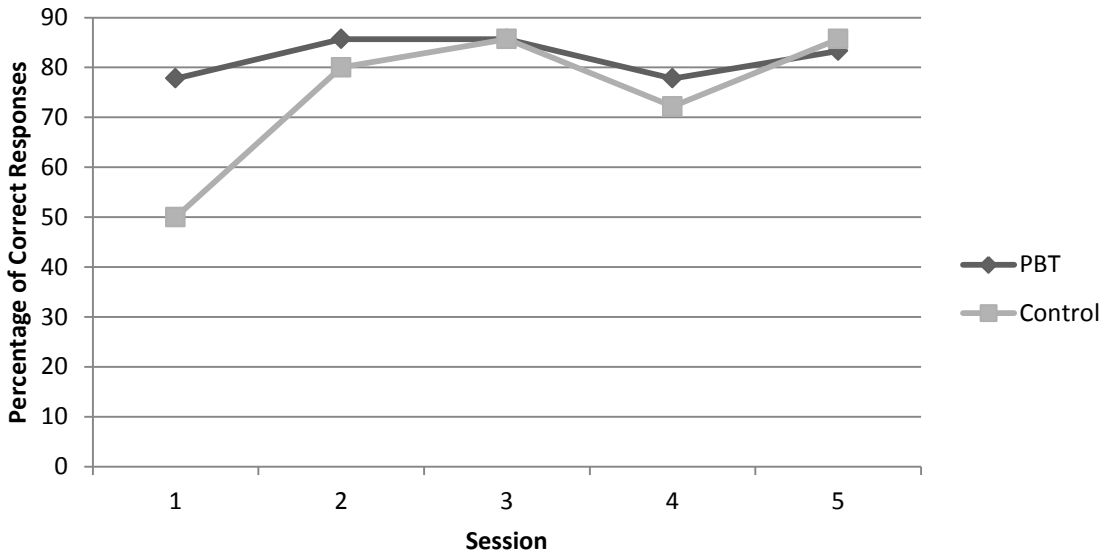

Figure 2. Percentage of correct responses per session for Mark.

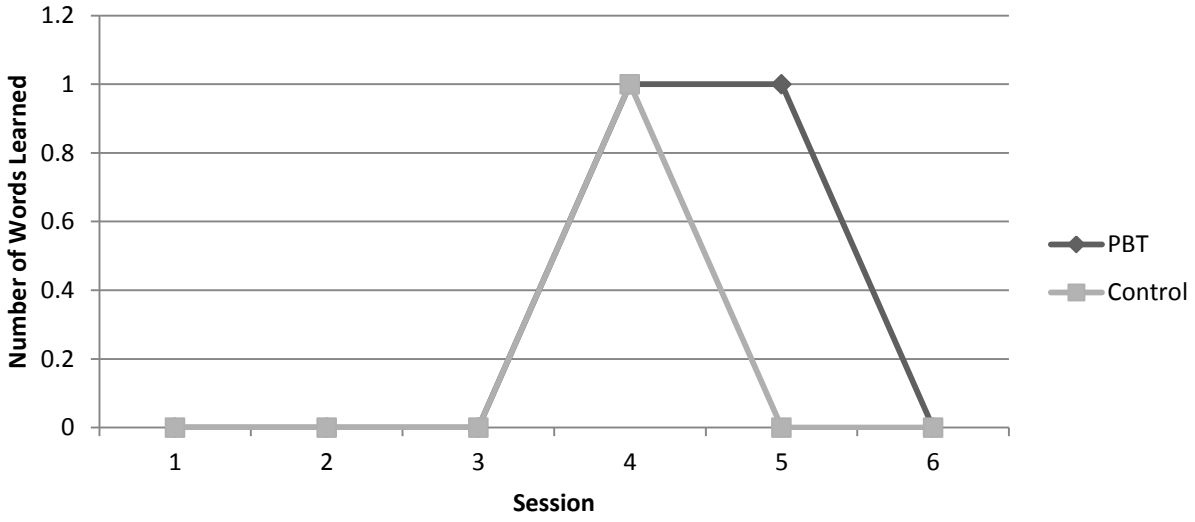

Figure 3. Number of skills learned per session for Jay.

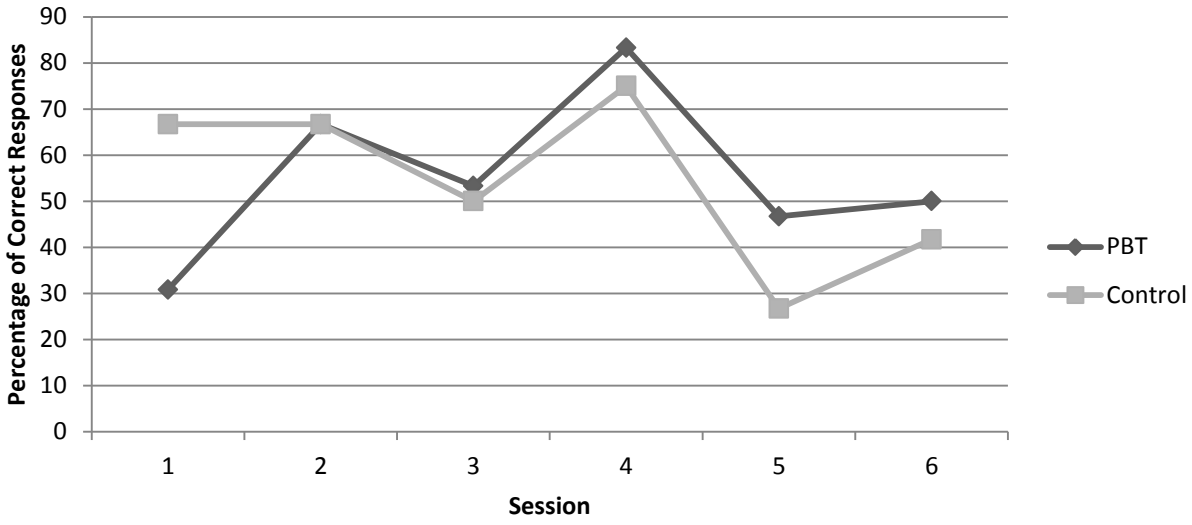

Figure 4. Percentage of correct responses per session for Jay.

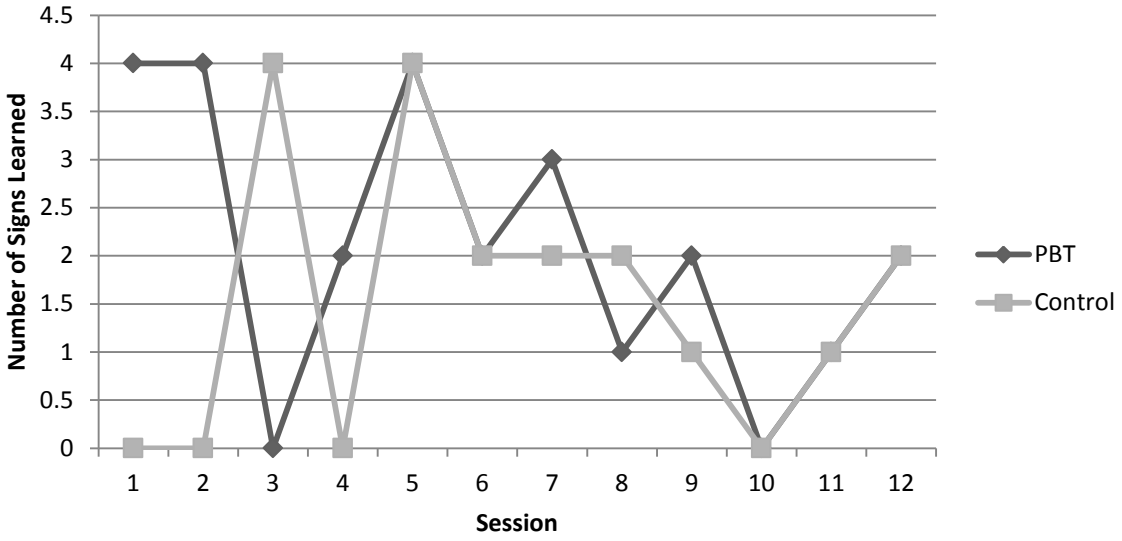

Figure 5. Number of skills learned per session for David.

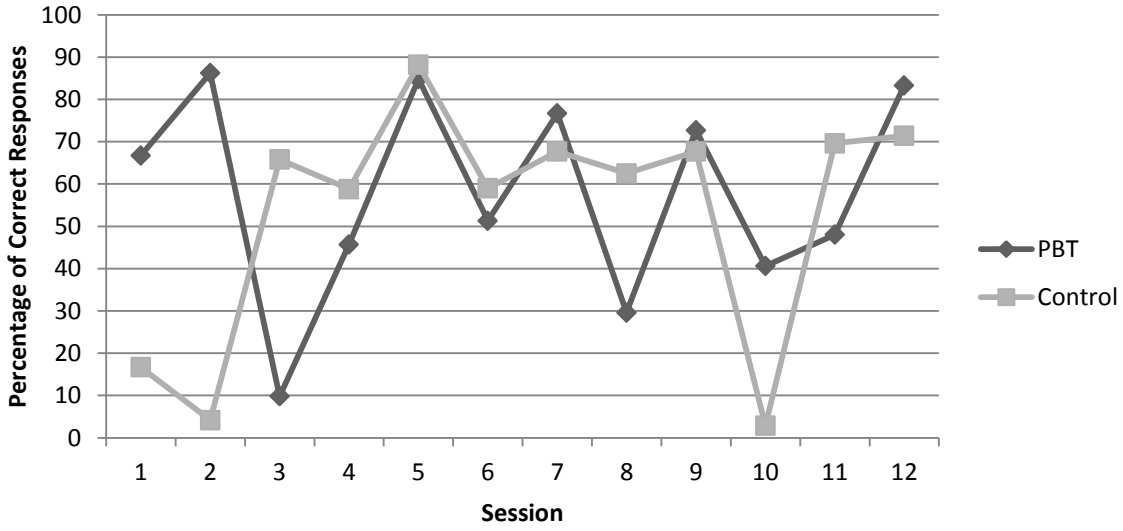

Figure 6. Percentage of correct responses per session for David.

Table 1. Results of Jay's generalization assessment

	PBT	DTT
Number of Correct Responses	2	1
Total Number Tested	2	1
Percentage of Correct Responses	100	100

Table 2. Results of Mark's generalization assessment

	PBT	DTT
Number of Correct Responses	5	6
Total Number Tested	10	10
Percentage of Correct Responses	50	60

Table 3. Results of David's first generalization assessment

	PBT	DTT
Number of Correct Responses	2	1
Total Number Tested	8	6
Percentage of Correct Responses	25	16.7

Table 4. Results of David's second generalization assessment.

	PBT	DTT
Number of Correct Responses	1	1
Total Number Tested	5	5
Percentage of Correct Responses	20	20

Table 5. Results of David's third generalization assessment.

	PBT	DTT
Number of Correct Responses	2	2
Total Number Tested	3	3
Percentage of Correct Responses	66.7	66.7

Table 6. Combined results of David's three generalization assessments.

	PBT	DTT
Number of Correct Responses	5	4
Total Number Tested	16	14
Percentage of Correct Responses	31.6	28.6

Appendices

Appendix A – Parent Letter

Appendix B – Informed Consent for Child Participant

Appendix C – Informed Assent for Minor Participant

Appendix D – Participant 1 Preference Assessment List

Appendix E – Participant 2 Preference Assessment List

Appendix F – Paired Preference Assessment Form

Appendix G – Participant 3 Preference Assessment List

Appendix H – Participant 1 Task Analysis

Appendix I - Participant 1 Sign List

Appendix J – Participant 2 Word List

Appendix K – Participant 3 Question List

Appendix L – Participant 1 Teaching Procedure

Appendix M – Participant 2 Teaching Procedure

Appendix N– Participant 3 Teaching Procedure

Appendix A

Parent Letter

Dear Parent:

My name is Liam Cerveny and I am a graduate student at The College at Brockport – SUNY, in the Psychology Master of Arts (MA) program. I am asking for your permission to conduct the study with your child in one or a few classrooms at the Dazzle School of Visual & Performing Arts. The purpose of this study is to evaluate the usefulness of a method of teaching children new skills called preference-based teaching. The preference-based teaching method involves allowing students to work on preferred activities before, during, and after working on an educational/vocational task. The goal of the intervention is to increase the rate of learning by making the process more positive. Prior to commencing the study, approval to conduct the study will be given by Dazzle, The College at Brockport – SUNY Institutional Review Board, and my thesis committee. I am conducting this study for completion of my Master's Thesis. If you want your child to take part in the study, please sign and date the consent form and send it back to school with your child. You will receive a copy of that consent form after I have signed it. If you are interested in the study but have questions, please contact me either by phone at (585) 613-2477, or email at ldcerveny@gmail.com. Thank you.

Appendix B

Informed Consent for Child Participation in Research Given by Parents/Guardians

The College at Brockport – SUNY
Department of Psychology

Purpose of Study

You are being asked to allow your child to participate in a research study. This study will evaluate whether allowing a student to work on preferred activities before, during, and after an educational task leads to more rapid learning, more on-task behavior and less off-task behavior when the student is doing school work compared to when it is not used.

Procedures

Your child will be paired with me, my professor, or an undergraduate research assistant (RA), as available. Twice a week, the pair will work one-on-one in the classroom to complete task(s) that your child normally works on while at Dazzle. On each of these days, there will be two sessions. In one session, the RA will present your child with a work task and use a training procedure to teach your child to correctly respond to the task using praise and providing assistance as needed. In the second session, in addition to the training procedures, the RA will offer your child the chance to work on a preferred activity before, during, and after the scheduled work task. Before an RA works with your child, the Principal Investigator (Liam Cerveny) will meet with your child's teacher to discuss the methods that the school staff uses to help your child learn. The total study is scheduled to last approximately two months.

Possible Benefits

The goal of this study is to increase rate of learning and on-task behavior of students when working on school tasks. Your child may benefit from the study by improving their ability

to work on the activities presented in the study, which are all educationally and vocationally based. Additionally, the child may generalize their positive social interactions to others and may work on other tasks more effectively.

Possible Costs/Risks

There is no financial compensation for participating in this study. There is also no cost to the student or their families for participating. Some of the activities worked on by the student-RA dyads may be activities that the student does not learn nor enjoy. This could lead to the student becoming frustrated or upset. If the student becomes so upset that s/he cannot continue to work on a task, the research session will end immediately.

Confidentiality

All information collected for the study will be confidential. Names will not be included on any data sheets. Instead, each participant will be given an ID number for all recording purposes. All data will be stored in a secure office in the psychology department on the campus of The College at Brockport - SUNY, or on a password protected computer, by the investigator. All study records, including approved IRB documents, study data, and consent forms will be destroyed by shredding or deleting 3 years after completion of the study. If the results of this study are published for scientific purposes, the names and other identifying factors of the participants will not be included. Age and medical diagnosis may be reported. In addition to the researchers involved, the College at Brockport - SUNY Institutional Review Board may view any records kept related to the study.

Termination of Research Study

Participation in this study is completely voluntary. There is no cost or penalty to your child if you choose to not have them participate. If you child is involved in the study, you may stop their participation at any time, for any reason.

Available Sources of Information

For more information, please contact:

Liam Cerveny, primary researcher, either by phone at (585) 613-2477, or email at ldcerveny@gmail.com

Dr. Marcie Desrochers, Faculty Advisor and Associate Professor, Department of Psychology, The College at Brockport – SUNY, (585) 395-5634, mdesroch@brockport.edu

You may also contact the SUNY Brockport Institutional Review Board (IRB) via Julie Wilkens, IRB Compliance Officer (585) 395-2779. The IRB is a college committee concerned with the protection of human research participants.

****

I am 18 years of age or older and I have read and understand the information in this consent form. I give my child permission to participate in this study. I understand that I will receive a copy of this form after it has been read and signed.

I would like to receive a copy of the results of this study: _____ Yes _____ No

Mailing Address:

_____

_____

_____ _____

Printed name of Parent/Legal Guardian Signature of Parent/Legal Guardian

_____

Signature of Person Obtaining Consent

Child's Name & Date of Birth _____

Appendix C

Informed Assent for Minor Participants

To be read aloud to each potential student participant:

I want to work with you. As we work, I will write down some of the things that you and I are doing. This is for a research study.

If you do let me work with you, I will not write your name down or tell anyone who you are.

You do not have to be in this study if you do not want to. If you want to be in the study, but then change your mind, that is okay too.

I will answer any questions you have about this study.

If you want to be a part of the study, please write your name on the line below.

I understand the information provided in this form and agree to participate in this project.

_____ _____

Signature of participant (if able) Date

_____

Printed name of participant

_____ _____

Signature of a witness 18 years of age or older Date

Appendix D

Items for Participant 1's Preference Assessment

Barrel of monkeys

Pin point impression frame

Magnetic spinning wheel

Stickers

Coloring

Beads

Appendix E

Items for Participant 2's Preference Assessment

Sports magazine

Wall pushups

Pin point impression frame

Magnetic spinning wheel

Squats

Coloring

Appendix F

Paired Preference Assessment

Participant #___ put a line through the chosen item/activity

Item 1	Item 2
Item 3	Item 4
Item 5	Item 6
Item 1	Item 4
Item 3	Item 2
Item 4	Item 5
Item 6	Item 1
Item 6	Item 3
Item 5	Item 2
Item 1	Item 3
Item 4	Item 6
Item 5	Item 1
Item 2	Item 4
Item 3	Item 5
Item 2	Item 6

Appendix G

Items for Participant 3's Preference Assessment

Toy rubber/plastic bugs

Handheld video game

Magnetic spinning wheel

Motorized walking chickens

Beads

Pin point impression frame

Coloring

Barrel of Monkeys

Playing cards

Appendix H

Participant 1 Task Analysis

Note: All behavioral definitions are for specific signs taken from American Sign Language (ASL). ASL is a visual-based language in which the hands are formed and moved in a specific way to convey different words and meanings. The two main components of each sign are hand shape (the form/structure of the hand/hands), and movement (the direction and speed of the hand/hands).

List for Control Trials

Behavioral Definition	Task Analysis
Cat	1. Tuck thumb and pinky toward palm, leaving the three middle fingers out 2. Place hand on cheek, near lips 3. Pull hand away from face, towards ear
Happy	1. Hold hand flat, with all fingers extended 2. Place palm on chest 3. Move hand up towards face 4. Move hand away from body in a circular motion 5. Repeat steps 2-4
Sad	1. Hold both hands with fingers extended and spread 2. Place hands in front of eyes, fingers pointing up 3. Pull hands down, stopping when fingers reach chin
Stop	1. Hold dominant hand, fingers extended, perpendicular to the ground 2. Hold non-dominant hand, fingers extended, parallel to the ground 3. Bring dominant hand down onto non-dominant hand
Jump	1. Tuck thumb, pinky, and ring finger of dominant hand and extend middle and pointer fingers 2. Hold non-dominant hand flat, palm up 3. Place middle and pointer fingers of dominant hand on palm of non-dominant hand 4. Lift dominant hand off of non-dominant hand, bending the knuckles of ring and middle fingers
Car	1. Hold both hands, in fists facing up, about shoulder width apart 2. Simultaneously, pull the right hand up and the left hand down in a circular motion 3. Reverse the movement, with the right hand going down and the left hand going up
Toy	1. Tuck thumbs under index fingers 2. Hold both hands shoulder length apart, in front of self, with elbows

	bent, and palms facing self 3. Rotate wrists so that palms face out 4. Rotate wrists back so that palms face self
Pants	1. Taking index finger and thumb, reach down and grab leg of pants 2. Tug on pants leg
Wants	1. Hold both hands open, fingers separated 2. Hold hands in front of self with palms up 3. Bring hands towards self, stopping at chest
I (me)	1. Extend pointer finger, tucking other fingers into a fist 2. Point index finger at own chest
Mom	1. Hold hand with fingers stretched and separated 2. Place thumb on chin
Teacher	1. Hold both hands with thumb underneath four fingers, palm down, and parallel to floor 2. Move hands from temples of head out, in front of self 3. Rotate hands so that palms face each other 4. Move thumbs so that they are point up 5. Move hands down until they are in front of chest
Sister	1. With both hands, tuck all fingers in except pointer 2. Touch jaw with pointer of dominant hand 3. Move dominant hand in front of self 4. Bring pointers together lengthwise, palms facing down
Tree	1. Bring tips of all fingers of dominant hand together, while keeping fingers extended 2. Make "C" shape with non-dominant hand 3. Bring fingers of dominant hand through the C of the non-dominant hand 4. Spread fingers of dominant hand

List for PBT Trials

Behavioral Definition	Task Analysis
Mad	1. Hold hand open with fingers spread apart 2. Hold hand in front of face, with palm facing face 3. Move hand away from face while bending fingers
Run	1. With both hands, tuck middle, ring, and pinky fingers in, while keeping thumb up and index finger extended 2. Put one hand in front of the other 3. Wrap index finger of back hand around thumb of front hand 4. Move hands directly in front of chest 5. Move hands straight out, away from chest, while bending and straightening front index finger
Go	1. With both hands, extend index fingers while tucking all other fingers in 2. Start with index fingers pointing up, then simultaneously point both

	in the same direction
Dance	1. Hold non-dominant hand, fingers extended, palm up, just above waist height 2. Tuck thumb, ring finger, and pinky of dominant hand, extending pointer and middle fingers 3. Hold dominant hand over non-dominant hand so that the tips of the index and middle fingers of the dominant hand are not touching the palm of the non-dominant hand 4. Use wrist of dominant hand to shake index and middle fingers over non-dominant hand
Book	1. Extend fingers of both hands 2. Bring hands together, palms facing each other 3. Rotate both hands down so that palms are facing up 4. Repeat steps 2-3
Shoes	1. Make fists with both hands 2. Hold hands so that they are in front of self, knuckles facing out 3. Bump hands together twice
Don't Want	1. With both hands, stretch and spread fingers 2. Hold hands in front of self, palms facing up 3. Rotate wrists so that palms are facing out and fingers are pointing up 4. Push hands forward, away from self
You	1. Extend pointer finger, tucking all other fingers in 2. Point at other person
Shower	1. Hold hand above head 2. With palm facing down at head, spread fingers out wide 3. Pull hand slightly up while bringing fingers back together 4. Repeat steps 2-3
Cold	1. Make fists with both hands 2. Hold hands about shoulder width apart with thumbs and index fingers on top 3. Shake hands back and forth
Dad	1. Extend all fingers on one hand 2. Place thumb of finger on forehead
Friend	1. With both hands, tuck in all fingers except for index fingers 2. With left hand palm up and right hand palm down, wrap index fingers together 3. Switch so that left hand palm is down and right hand palm is up, and wrap index fingers together
Brother	1. With both hands, keep index fingers out, while tucking in all other fingers 2. Touch index finger of dominant hand to temple 3. Move dominant hand down to non-dominant hand 4. With both palms facing down, put hands together so that index fingers touch lengthwise
Sit	1. With both hands, extend index and middle fingers while tucking in

	other fingers 2. Hold dominant hand above non-dominant hand, both with palms facing down 3. Bring index and middle fingers of dominant hand onto index and middle fingers of non-dominant hand so that they form an X

List for Known Trials

Milk	1. Make a fist 2. Open and close fingers several times
Juice	1. Hold hand, in a fist, with index finger touching chin 2. Open and close the fingers of the hand
Hot	1. Hold hand with fingers stretched 2. Move hand toward mouth 3. Move hand away from mouth
Please	1. Hold hand with an open palm, fingers stretched 2. Place palm on chest 3. Rub chest in circular motion
More	1. With both hands, extend all fingers, but keep tips together 2. Touch fingers tips of each hand together twice
Drink	1. Make a C shape with hand 2. Bring hand to mouth, with thumb and pointer finger on top 3. Rotate wrist so that pointer finger moves toward nose
Help	1. Make a thumbs up shape with dominant hand, thump pointing up 2. Hold non-dominant hand flat, palm up 3. Place dominant hand on non-dominant hand

Appendix I

Participant 1 Sign List

Control	Experimental	Known Signs
Cat	Mad	More
Happy	Run	Drink
Sad	Go	Walk
Stop	Dance	Eat
Jump	Book	Milk
Car	Shoes	Juice
Toy	Don’t Want	Hot
Pants	You	Please
Wants	Shower	Help
I (me)	Cold	
Mom	Dad	
Teacher	Friend	
Sister	Brother	
Tree	Sit	
Different	Look	
Hungry	Thirsty	
Home	Name	

Appendix J

Participant 2 Word List

Experimental:	Control:
Their	Warm
Mother	Father
Juice	Water
Drink	Upset
Angry	Think
Move	Jump
Dance	Train
Please	Clap
Shower	Brother
Cousin	Sister

Appendix K

Participant 3 Question List

Experimental:

How old are you?

What is your favorite food?

What is your favorite class?

Control:

What is your name?

What grade are you in?

What is your favorite color?

Appendix L

Participant 1 Teaching Procedure

Purpose: To teach functional signs of American Sign Language (ASL) to a student with developmental disabilities

Teaching Steps:

1. Clear the working area of distractions
2. Explain to the student what he will be working on
    a. "I am going to be teaching you some signs today,"
3. Model the sign that we are currently working on
    a. Say "This is the sign for ___" while signing the word
4. Say "Sign (current word)"
    a. Provide immediate praise and a reinforcer for a correct sign
    b. Wait five seconds for the student to sign the word
    c. If there is no response, prompt by saying "sign (current word)" and making the correct handshape for the student to imitate
    d. Wait five seconds for the student to complete the sign
    e. If the student does not complete the sign, prompt further by showing the hand placement of the sign
    f. If the student signs the wrong sign, say "No," and shake head, then say "(current word)" and sign the word again

5. A sign will be considered learned when the student can correctly sign the word six times in a row when given only a verbal prompt
    a. After the training session, generalization probes will be conducted for all learned signs.

Experimental Condition

1. After sitting down with the student, present him with two preferred items and ask which one he would like to play with
    a. Let him play with the item for 1 minute
    b. After 1 minute, ask for the item back, and begin the work session
2. 7-8 minutes into the session, present the two preferred items again and ask which one he would like to play with
    a. Try to introduce this during a natural break in the work session (e.g. after a word has been successfully learned)
    b. Let him play with the item for 1 minute
    c. After 1 minute, ask for the item back, and continue the work session
3. After the session is over, present the two preferred items again and ask which one he would like to play with
    a. Let him play with the item for 1 minute
    b. After 1 minutes, ask for the item back, and tell him that the session is over

Appendix M

Participant 2 Teaching Procedure

Purpose: To teach the writing of individual words to a student with developmental disabilities

Teaching Steps:

6. Clear the working area of distractions
7. Explain to the student what he will be working on
    a. "We are going to be writing words today,"
8. Show the student the list of words to be written
9. Say "Write (current word)"
    a. Provide immediate praise and a reinforcer for a correctly written word
    b. Wait five seconds for the student to begin to write the word
    c. If there is no response, prompt by repeating "Write (current word)"
    d. Then verbally spell out the word as the participant writes it (e.g., "B", once he finishes writing b, then say, "A", once he finishes writing a then . . . .= full prompt)
    e. Provide immediate praise for a correctly spelled word after a correct prompted or probed trial and 3-5 sec of a preferred item following a probed trial
    f. If the participant spells the word correctly, begin the next trial by waiting an additional two seconds before saying each letter (referred to as partial prompt 2)
    g. If the participant spells the word incorrectly, say "Stop," have him put down his pen, and wait for 5 seconds, then say "It's (spell out the word)"

h. Repeat steps for each trial, increasing the time between verbal prompts by one second for each trial in which a word was correctly spelled

Experimental Condition

4. After sitting down with the student, present him with two preferred items and ask which one he would like to play with
    c. Let him play with the item for 1 minute
    d. After 1 minute, ask for the item back, and begin the work session
5. 7-8 minutes into the session, present the two preferred items again and ask which one he would like to play with
    d. Try to introduce this during a natural break in the work session (e.g. after a word has been successfully learned)
    e. Let him play with the item for 1 minute
    f. After 1 minute, ask for the item back, and continue the work session
6. After the session is over, present the two preferred items again and ask which one he would like to play with
    c. Let him play with the item for 1 minute
    d. After 1 minutes, ask for the item back, and tell him that the session is over

Appendix N

Participant 3 Teaching Procedure

Purpose: To teach an individual with developmental disabilities to appropriately answer questions about personal information

Teaching Steps:

1. Clear the working area of distractions
2. Explain to the student what we will be working on
3. Show the student the list of questions to be asked
4. Ask Question #1
5. Wait 5 sec for a response
6. If correct then provide verbal praise and a preferred item
7. If an incorrect or omitted response occurs then
8. Ask Question #1 and
    a. Provide potential answers to the question asked
    b. Provide immediate praise for a correctly answered question after a correct prompted or probed trial and 3-5 sec of a preferred item following a probe trial
    c. If the participant answers the question inappropriately, look away, and remain silent for 5 seconds and ask the question again
    d. Repeat steps for each trial, increasing the time between verbal prompts by one second for each trial in which a question was answered appropriately

EXPERIMENTAL PROCEDURE

During the experimental procedure, the participant will be asked to choose between two activities at specific times. These two activities will be the participant's two most preferred activities, as determined by a preference assessment. The participant will be given the option of which activity to use immediately before and after engaging in the work task detailed above. The participant will also be offered both preferred activities halfway through the work period.

Annotated Bibliography

Choice Making and Preferred Activities

Romaniuk, C., & Miltenberger, R.G. (2001). The influence of preference and choice of activity on problem behavior. *Journal of Positive Behavior Interventions, 3,* 152-159.

The authors of this study reviewed the literature on providing preferences and choices to people with DD to decrease their problem behavior. The authors did not provide the exact criteria used for articles to be included in the review, but rather referenced specific articles that demonstrated the concepts that the authors were highlighting. Importantly, the authors explained the distinction between preference and choice. A preference is something, an item or activity, that an individual has previously shown a desire for over other, similar, items or activities. Providing a choice involves presenting at least two options to an individual and letting that individual pick from among those options. In both cases, the item or activity being offered is something that the individual has some desire for. With preferences, that desire has been previously established or observed. With choices, the desire is being demonstrated by the individual at the current time.

Through their review, the authors found that both preferences and choices have been shown to reduce the problem behaviors of people with DD. This was true when preferences or choices were used alone, or as part of a multicomponent intervention. The proposed study will use both preferences and choices as a way to begin a rapport building intervention between a student with DD and a staff member. Reductions in problem behavior provided by the presentation of preference and choice will be important. Fewer problem behaviors, and less time

spent dealing with those behaviors, will allow the staff member to focus more on the rapport building aspect of the intervention.

Seybert, S., Dunlap, G., & Ferro, J. (1996) The effects of choice-making on the problem behaviors of high school students with intellectual disabilities. *Journal of Behavioral Education, 6,* 49-65.

The authors describe a choice-making intervention was used with three high school students with Intellectual Disability (ID) to reduce their problem behaviors. The participants were two males, one aged 14 years and one aged 15 years, and one female, aged 21 years. The types of problem behavior varied by participant; the 14 years old male engaged in stereotypic responding and inappropriate vocalizations, the 15 year old male engaged in noncompliance, verbal resistance, and complaining, and the 21 year old female displayed vocal outbursts, self-stimulation, and noncompliance. The study took place at the school that all three participants attended. The researchers used a nonconcurrent multiple baseline across participants design. An ABA reversal design was also used, in which each participant was first exposed to a no-choice condition, followed by a choice condition, before reversing back to the no-choice condition. The activities that each participant engaged in for the study were vocational tasks that each had been working on prior to the start of the study. These tasks were provided by each participant's teacher.

The dependent variable for the study was the percentage of intervals containing problem behavior and task engagement. These intervals were recorded by a researcher, with a second researcher recording around 30% of sessions to provide interobserver agreement. While all three participants had different rates of problem behavior and task engagement in the original no-

choice stage, a clear baseline was evident for each participant. All three participants also showed a clear decrease in rates of problem behavior and an increase in task engagement following the introduction of choice offering in the experimental phase. For the female and one male participant, the rates of problem behavior and task engagement clearly returned to above-treatment level during the reversal phase. For the second male participant, a stable baseline was not attained in the reversal phase, although the authors note that this was partially due to the end of the school year causing a forced end to the study. For two of the three participants, it was clear that the choice-making phase saw more task engagement and less problem behavior. While that pattern was not clearly shown for the third participant, task engagement increased and problem behavior decreased initially at the introduction of the choice-making phase.

Shogren, K.A., Faggella-Luby, M.N., Bae, S.J., & Wehmeyer, M.L. (2004). The effect of choice-making as an intervention for problem behavior: A meta-analysis. *Journal of Positive Behavior Interventions, 6*, 228-237.

The authors conducted a meta-analysis of studies focusing on providing choice to people with developmental disabilities (DD) as a means of reducing their problem behavior. The meta-analysis included 13 published articles, and 30 total participants. For articles to meet inclusion criteria, the participants had to have an identified disability, the intervention being researched had to consist of offering a choice to the participant(s) in order to reduce problem behavior, problem behavior itself was measured as a dependent variable, and the results were presented graphically with clear distinctions between choice and no-choice conditions. Problem behavior encompassed a variety of possible behaviors including aggression, destruction of property, off-

task behavior, and noncompliance. The results of the meta-analysis showed choice-making interventions to be effective in treating problem behavior. The authors note that the interventions resulted in occurrences of problem behavior below the lowest baseline data point 65.7% of the time. In addition, once occurrences of problem behaviors reached zero, they remained at zero in 42.3% of cases. These results show that choice-making interventions can reduce the rate of problem behaviors among people with DD.

Discrete Trial Training

Coleman, M.B., Cherry, R.A., Moore, T.C., Park, Y., & Cihak, D.F. (2015). Teaching sight words to elementary students with intellectual disability and autism: A comparison of teacher-directed versus computer-assisted simultaneous prompting, *Intellectual and Developmental Disabilities, 53,* 196-210. doi: 10.1352/1934-9556-53.3.196.

The researchers compared the effectiveness of teaching sight words to children with DD through either a teacher-directed or computer-assisted prompting procedure. Three participants were recruited from an elementary school, aged 9 to 11 years. All three participants were diagnosed with Intellectual Disability (ID) and two were also diagnosed with ASD. To compare the teacher-directed and computer-assisted prompting interventions, the researchers used an adapted alternating treatments design. The phases used for the study were baseline, technology training, alternating treatments, and a preference phase where the participants preferred condition was used. Two of the participants learned more during the teacher-directed phase than the computer assisted-phase. All three of the participants preferred the teacher-assisted phase. All three of the participants learned some of the targeted material in both conditions, showing that

prompting is an effective means of teaching children with DD and can be applied in multiple ways.

Crockett, J.L., Fleming, R.K., Doepke, K.J., Stevens, J.S. (2007) Parent training: Acquisition and generalization of discrete trials teaching skills with parents of children with autism. *Research in Developmental Disabilities, 28,* 23-26. doi:10.1016/j.ridd.2005.10.003.

The authors of this article taught DTT skills to two mothers of children with autism. The goal was for parents to acquire skills in administering DTT to their children so that they could use those skills at home. The authors also wanted to examine how the parents were able to generalize their knowledge of DTT beyond the specific instructions they were given. Both parents were able to effectively learn how to administer the DTT intervention and were able to somewhat generalize their skills to other areas. The authors suggest that training parents is a useful endeavor and suggest the development of a less intensive training regimen to appeal to more parents.

Da Fonte, M.A., Boesch, M.C., Edwards-Bowyer, M.E., Restrepo, M.W., Bennett, B.P. (2016). A three-step reinforcer identification framework: A step-by-step process. *Education and Treatment of Children, 39,*389-410.

In this article, the authors describe a process for identifying reinforcers for students with DD. The authors note that it is important to identify and use reinforcers when teaching students with DD because it leads to greater task engagement, learning, and acquisition of adaptive behaviors. To identify reinforcers, the authors describe a three step process. The first step is to put together a preference inventory, made up of items that are preferred to the individual being assessed. These preferred items should be taken from a range of categories including activities,

edible items, sensory items, and social activities. The second step is creating a preference hierarchy by conducting a preference assessment of all of the previously identified preferred items and activities. This will show what items and activities are most preferred by the individual being assessed. The third step is conducting a reinforcer assessment of the most preferred items and activities, as identified in step 2. In the reinforcer, the teacher has the student engage in a learning task. When the student correctly completes a step, the teacher offers one of the preferred items to the student and then documents the result. The preferred items that result in the student continuing to engage in the task are then determined to be reinforcing.

Downs, A., Downs, R.C., Fossum, M., & Rau, K. (2008). Effectiveness of discrete trial teaching preschool students with developmental disabilities. *Education and Training in Developmental Disabilities, 43*, 443-453.

The authors describe a two-year longitudinal study examining the effectiveness of DTT with preschool students with DD. Two separate DTT implementation methods were used. The first had participants engage in 3 10-15 minute DTT session per school day, while the second had them engage in one 20-45 minute session each school day. Before the intervention started, all participants were assessed as having delays in areas of functioning including communication, motor skills, language, social/adaptive behavior, and cognition. Both forms of DTT intervention were effective in addressing these behavioral deficit areas. This finding is significant because the researchers built the interventions into the daily school structure that was already in place. It is much easier to implement an intervention if it fits into a preexisting program.

Downs, A, Downs, R.C, & Rau, K. (2008). Effects of training and feedback on discrete trial teaching skills and student performance. *Research in Developmental Disabilities, 29,* 235-246. doi: 10.1016/j.ridd.2007.05.001

Down, Down, and Rau (2008) describes the results of a study focused on teaching DTT skills to undergraduate research assistants (RAs). The RAs received an eight hour training in administering DTT. They then implemented these skills while working preschool children with DD. Data was collected documenting the RAs correct implementation of the DTT skills they had learned. The RAs were then given verbal and written feedback on how well they were able to administer the intervention. Following this feedback, the RAs were able to administer the intervention more faithfully. This ability to successfully administer the intervention lasted throughout the duration of the study.

Ferraioli, S., Hughes, C., Smith, T. (2005). A model for problem solving in discrete trial training for children with autism. *Journal of Early and Intensive Behavior Intervention, 2,* 224-246. doi: 10.1037/h0100316.

The authors detail several ways of increasing the effectiveness of DTT. The first step is to be able to reliably determine if the student is not making progress with their current teaching procedure. The next step is to determine the reason why the student is not progressing. This is done following a step-by-step plan evaluating many potential factors. Throughout these steps and the problems and potential solutions that will be identified, the main point that the authors make is to keep the process individualized. Finding the exact reason why a particular student is failing to make progress will lead to the solution quicker than using a blanket approach to all students. The authors detail several potential solutions to common problems, such as ensuring that the teaching material is clear, engaging, and reinforcing, that verbal demands are clear, that

prompting is effective in evoking the desired response, and that the student is motivated to work on the desired task.

Knox, A.M., Rue, H.C., Wildenger, L., Lamb, K., & Luiselli, J.K. (2012). Intervention for food selectivity in a specialized school setting: Teacher implemented prompting, reinforcement, and demand fading for an adolescent student with autism. *Education and Treatment of Children, 35,* 407-417.

The authors evaluated the effectiveness of a DTT intervention utilizing prompting, reinforcement, and demand fading to reduce the food selectivity with a 16 year old girl with ASD. Food selectivity is defined as the limited intake of food due to texture, taste, or familiarity. The study took place at the participant's school during her regularly scheduled lunch time. The researchers used a changing criterion design, with the goal of the participant eating progressively larger quantities of food. A teacher or teacher's aide (TA) placed three different colored plates, three different colored bowls with three different foods in front of the participant. The plates and bowls of the same color held the same food. The bowls were presented to the participant and the teacher/TA said that if the participant ate the food, she would get a specific reinforcer. The participant was given verbal reinforcement for taking the bowl, placing food in her mouth, chewing, and swallowing. For each bowl the participant ate, she was given a sticker to place on a chart and allowed to pick out an item that she liked. If the participant did not take any food for 30 seconds, the teacher/TA would prompt her by saying "Eat your lunch." To increase the criterion for reinforcement the amount of food placed into the bowl, as opposed to the plate, was gradually increased throughout the study. The results showed that the participant ate much more during the intervention phase as opposed to the baseline phase. She consistently ate the

designated amount, even as the criterion was changed. The treatment effect lasted throughout follow-ups conducted 2 weeks, 6 weeks, and 7 months after the intervention had ended.

Lo, Y., Burk, B., Anderson, A.L. (2014). Using progressive video prompting to teach students with moderate intellectual disability to shoot a basketball. *Education and Training in Autism and Developmental Disabilities, 49,* 354-367.

The researchers evaluated the effectiveness in using progressive video prompting to teach three participants with moderate intellectual disability how to shoot a basketball using a multiple probe across participants design. All the three participants, one female and two male, were in 11 grade and aged 19-20 years old. Prior to the intervention, they were not able to complete more than two of the eight designated steps for shooting a free throw. Both the number of steps completed and whether or not the participant scored on their shot were used as dependent variables. Video clips were also made of a researcher conducting the 8 designated steps to shoot a free throw. Three videos were made with different steps chunked together. Video clip 1 showed steps 1-3, video clip 2 showed steps 1-6, and video clip 3 showed steps 1-8. In each, the researcher would explain each step individually, and then demonstrate each step in continuous succession. Intermittent, noncontingent praise was offered to the participants while they practiced the steps, but no direct feedback was given.. In the second and third video clips, the steps that were shown in the previous video clip would be done in continuous succession at the beginning of the clip, with the new steps following the previously described pattern. The researchers conducted follow-up probes one and two weeks after the intervention ended to test for maintenance effects. All three participants were able to learn all 8 steps to criterion. At the maintenance evaluations, two of the three participants completed all 8 steps correctly, with the

third participant missing the same individual step at both points. The results showed that progressive video prompting was effective in teaching students the designated task.

Ringdahl, J.E., Kitsukawa, K., Andelman, M.S., Call, N., Winborn, L., Barretto, A., & Reed, G.K. (2002). Differential reinforcement with and without instructional fading. *Journal of Applied Behavior Analysis, 35,* 291-294.

The authors compared the effectiveness differential-reinforcement-based treatment packages with and without instructional fading in reducing problems behaviors during instructional settings. A multielement design was used with a single participant, an 8-year-old girl with autism. The study took place in a room within the hospital that the participant was staying in. The researchers utilized a differential reinforcement of alternative behavior (DRA) intervention for both conditions. In the DRA without instructional fading, the participant's teacher gave her instructions once every minute. Compliance with the instructions resulted in a one minute break. If the participant engaged in problem behavior, the teacher would present another instruction. DRA with instructional fading session were conducted by a behavior therapist. In the DRA with instructional fading sessions, the instructions and contingencies were the same as in the DRA without instructional fading sessions. For the first three DRA with instructional fading sessions, the behavior therapist did not deliver any instructions to the participant. Starting with the fourth session, the behavior therapist gave the participant an instruction every 15 minutes. Another instruction per 15 minute period was added for every session the participant was able to complete without engaging in problem behavior. The results showed that the participant engaged in significantly less problem behavior during the DRA with instructional fading sessions.

Shillingsburg, M.A., Bowen, C.N., Shapiro, S.K., (2014). Increasing social approach and decreasing social avoidance in children with autism spectrum disorder during discrete trial training. *Research in Autism Spectrum Disorders, 8,* 1443-1453. doi: 10.1016/j.rasd.2014.07.013.

The researchers evaluated an intervention designed to reduce social avoidance and increase social approach of children with autism. Two children with ASD were recruited. The study took place at a day care facility. A multi-elemental design with a reversal was used in which two therapists were randomly assigned to one of two therapist roles. Initially, both therapists would meet the participant and administer a typical DTT "demand" intervention. After baseline, the "demand" therapist would continue to meet with a participant for 10 minute DTT sessions. The "pairing" therapist would meet with a participant for a zero-demand, high reinforcement session, in which the participant had lots of access to preferred activities. Pairing sessions lasted about 20 minutes. Once the participants met criterion for in-seat behavior, the researchers' evaluation of high social approach and low social avoidance, during the pairing sessions, the pairing therapist returned to using the same conditions as in the demand sessions.

Both participants initially showed low levels of in-seat behavior with both the pairing and demand therapist, following by an increase in in-seat behavior with the pairing therapist during the no-demand intervention phase. During this phase, both participants continued to demonstrate relatively low levels of in-seat behavior with the demand therapist. Once the pairing therapist returned to using the demand intervention, both participants showed higher rates of in-seat behavior with the pairing therapist than with the demand therapist. This study showed that increasing social approach and decreasing social resistance, a significant problem for many people with ASD, can be achieved through systematic planning and effort. Importantly, this

higher social engagement remained even after the therapist returned to a demand focused DTT intervention. The effects transitioned from a low-demand environment to a high-demand, instruction focused setting.

Sith, T. (2001). Discrete trial training in the treatment of autism. *Focus on Autism and Other Developmental Disabilities, 16,* 86-92. doi: 10.1177/108835760110160020 4.

Smith (2001) highlights the reasons why using DTT is effective in teaching new behaviors to students with autism. The author begins by describing DTT as an intervention. He focuses on how individualization is a fundamental part of DTT and is useful for teaching behaviors to students with autism. Students with autism demonstrate a wide range of skills, abilities, and also deficits. Therefore, an individual approach is necessary for this population. Since the DTT approach focuses on individualization, DTT is a natural fit for working with children with autism. The author also mentions that DTT uses a simplified teaching approach which may benefit children with autism. By removing potential distractions from the work area, the student is better able to focus on learning the skills that the teacher presents. The author points out several drawbacks to the approach. Initially, the student may need lots of time working in a DTT setting to respond well to it. Teacher's administering DTT also need specialized training. In addition, a focus must be made to ensure that the student initiates the new behaviors being taught. Despite these limitations, DTT represents a worthwhile treatment intervention for teaching children with autism new behaviors.

Preference-Based Teaching

Green, C.W., Reid, D.H., Rollyson, J.H., & Passante, S.C. (2005). An enriched teaching program for reducing resistance and indices of unhappiness among individuals with profound multiple disabilities. *Journal of Applied Behavior Analysis, 38,* 221-233. doi: 10.1901/jaba.2005.4-04.

Green et al. (2005) evaluated an enriched teaching approach when teaching three individuals with developmental disabilities (DD) different tasks. The goal of the enriched teaching approach was to reduce the resistance and indices of unhappiness of the individuals with DD during the teaching session. The participants lived at a residential center for adults with DD. The control condition for each individual was a DTT teaching session that occurred each weekday and focused on learning a skill that the individual was working on prior to their entry into the study. For the experimental condition, featuring the enriched teaching approach, the staff member working with each participant offered the individual a preferred activity before engaging in the teaching session. The researchers also identified certain environmental conditions that were preferred by each participant and kept those conditions constant during the teaching sessions. In addition, when a participant showed resistance to the training session, the session was stopped for a brief time. During this stoppage, a preferred activity was presented, and then the teaching session was immediately restarted. Finally, following the completion of the teaching session, a preferred activity was presented for each participant to engage in.

The results of the study showed that resistance to the learning task and indices of unhappiness decreased for all three participants in the enriched teaching condition as compared to the control condition. Learning occurred at the same rate in both conditions, showing that the additional components added by the researchers did not hinder the instructional effectiveness of

the approach. Follow-up observations two to five weeks after the study ended showed that those reductions remained when the staff members implemented the enhanced teaching approach. The researchers also tested the social validity of the enhanced teaching approach and found that the staff members found it to be useful and effective. Two of the participants engaged in a multiple probe across participants design, while the third was engaged in a quasiexperimental AB design.

Reid, D.H., & Green, C.W. (2006). Preference-based teaching: Helping students with severe disabilities enjoy learning without problem behavior. *TEACHING Exceptional Children Plus 2,* Article 2. Retrieved 11/19/2015 from http://escholarship.bc.edu/education/tecplus/vol2/iss3/art2

The authors describe preference-based teaching, a method of instruction for people with disabilities. The authors note that many people with disabilities engage in problem behaviors that make instruction difficult. The aim of preference-based teaching is to limit such problem behaviors in order to spend more time on current instructional goals. This is achieved by offering preferred activities immediately before, during, and immediately after an instructional task.

Preference-based teaching begins with the teacher seeking to establish a good relationship with the student and limiting elements of the teaching environment that are nonpreferred by the student. Immediately before working on an instructional task, the teacher presents the student with an activity or task that is preferred by the student. The teacher then immediately transitions into a predetermined instructional task. During the instructional period, brief breaks of preferred activities are interspersed with the actual work on the task. Immediately following the completion of the instructional phase, an activity preferred by the student is presented by the teacher. This method of providing preferred activities prior to, during, and after

an instructional task is designed to maximize the student's focus on the task while minimizing problem behaviors.

Positive Reinforcement

Leaf, J.B., Dale, S., Kassardjian, A., Tsuji, K.H., Taubam, M., McEachin, J.J., & Leaf, R.B. (2014). Comparing different classes of reinforcement to increase expressive language for individuals with autism. *Education and Training in Developmental Disabilities, 49,* 533-546.

The authors evaluated the effectiveness of four different classes of reinforcers, food, praise, toys, and feedback, to increase the expressive language of three students, aged 4-5, diagnosed with autism. The study was conducted at a private clinic and utilized a parallel treatments design. The researchers implemented probe sessions before, during, and after the intervention with each participant. The probe sessions were used to evaluate how well each participant was responding to each particular reinforcer class. The results showed that all four of the reinforcement classes were effective in assisting the participants in learning the designated task. The amount of sessions required for each participant to attain mastery in a given class varied, with each participant responding best to a different class of reinforcer. This study demonstrates the powerful impact reinforcers can have, as well as the need to individualize reinforcers to the particular student.

Research Design

Barlow, D.H., & Hayes, S.C. (1979). Alternating treatments design: One strategy for comparing the effects of two treatments in a single subject. *Journal of Applied Behavior Analysis, 12*, 199-210. doi: 10.1901/jaba.1979.12-199.

This article details the use of the alternating treatments design for single subject research. The alternating treatments design is used to evaluate the individual effects of two interventions administered to a single participant at one time. Both interventions are administered on the same day in two distinct sessions. The order of the interventions is counterbalanced across days to ensure that the order does not account for any difference between the interventions. After the first intervention of the day there is a clear stopping point, followed by a brief break. After this break, the second intervention session can begin. This is done to eliminate any carryover effect from the first session to the second session.

Administering two separate interventions at the same time has certain advantages over a multiple baseline design. The main advantage is that using an alternating treatments design cuts down on the amount of time for a study to yield meaningful data. Rather than having two extended periods of establishing baselines, the participants can be exposed to each intervention at the start of the study. Any differences in treatment effect are then immediately observable as both interventions are administered on the same days.

Preference Assessments

Karsten, A.M., Carr, J.E., & Lepper, T.L. (2011). Description of a practitioner model for identifying preferred stimuli with individuals with autism spectrum disorder. *Behavior Modification, 4,* 347-369. doi: 10.1177/0145445511405184.

The authors define and describe four different types of preference assessments; paired-stimulus preference assessment, multiple-stimulus presentation method with item replacement, multiple-stimulus method without item replacement, and the free-operant method. In addition to detailing how to conduct each type of assessment, the authors also provide the strengths and weaknesses of each one, and offer considerations to practitioners to consider when determining which type of assessment would be most useful and effective. The two types of preference assessments used in the current study were the paired-stimulus assessment and the multiple-stimulus without replacement assessment. The paired-stimulus is able to identify multiple preferences and can allow for testing of a large number of items. However, it is more time consuming than other assessments. The multiple-stimulus without replacement is also able to identify multiple preferences and can be conducted in less time than the paired-stimulus preference assessment. However, it may lead to fewer items being tested due to the participants' ability to select any preferred item at any time.